FILARIASIS

Filariasis is most prevalent infection in tropical areas (warm and humid places) including India, because the vector (mosquito) can spread the disease effectively in tropical climate. Mainly three nematodes are responsible for lymphatic filariasis. They are *W. bancrofti*, *B. malayi* and *B. timori*.

Organism		Vector
1. *Wuchereria bancrofti*	–	Culex mosquito
2. *Brugia malayi*	–	Mansonia mosquito
3. *Brugia timori*	–	Anopheles mosquito and mansonia

Geographical Distribution

World: More than eleven crore people in the world are infected with these nematodes. Most of the cases are due to *Wuchereria bancrofti*.

India: India itself accounts for 1/3rd of the world cases. In India more than four crores (4% of the Indian population) are infected with either *W. bancrofti* or *B. malayi*. Around 40 crore people are living in filarial endemic areas. More than 1.5 crore persons are suffering from chronic filarial lesions.

Epidemiology

Agent Factors

Agent: *Brugia malayi* in Kerala and *W. bancrofti* in the rest of the India are the two nematodes responsible for filariasis in India.

Length of adult worm is 5–10 cm long in case of females and less than 4 cm in males. Female worms are longer and broader than male worms and live in lymphatic system (lymph glands, lymph vessels and connective tissue). They live for more than ten years.

Microfilaria (larva) of *W. bancrofti* (270 m) is longer than larva of *B. malayi* (220 m). Microfilaria of *W. bancrofti* appears as graceful sweeping curves and smooth tapering tail end, where as Mf of *B. malayi* is stiff with secondary kinks and its tail is also kinked at end.

Periodicity

The two nematodes display nocturnal periodicity, i.e., the Mf of these worms appear in peripheral blood in large numbers at night usually between 10 pm to 2 am.

Life Cycle

Man is a definitive host and mosquito is the intermediate host. Adult worm found in lymphatic system of man. Males are less than 4 cm long and females are 5 cm to 10 cm long. Females are viviparous. They give 50000 microfilaria per day. Life span of adult worm is around 15 years. Life span of Mf is around one year. Some may live longer periods also.

Host Factors

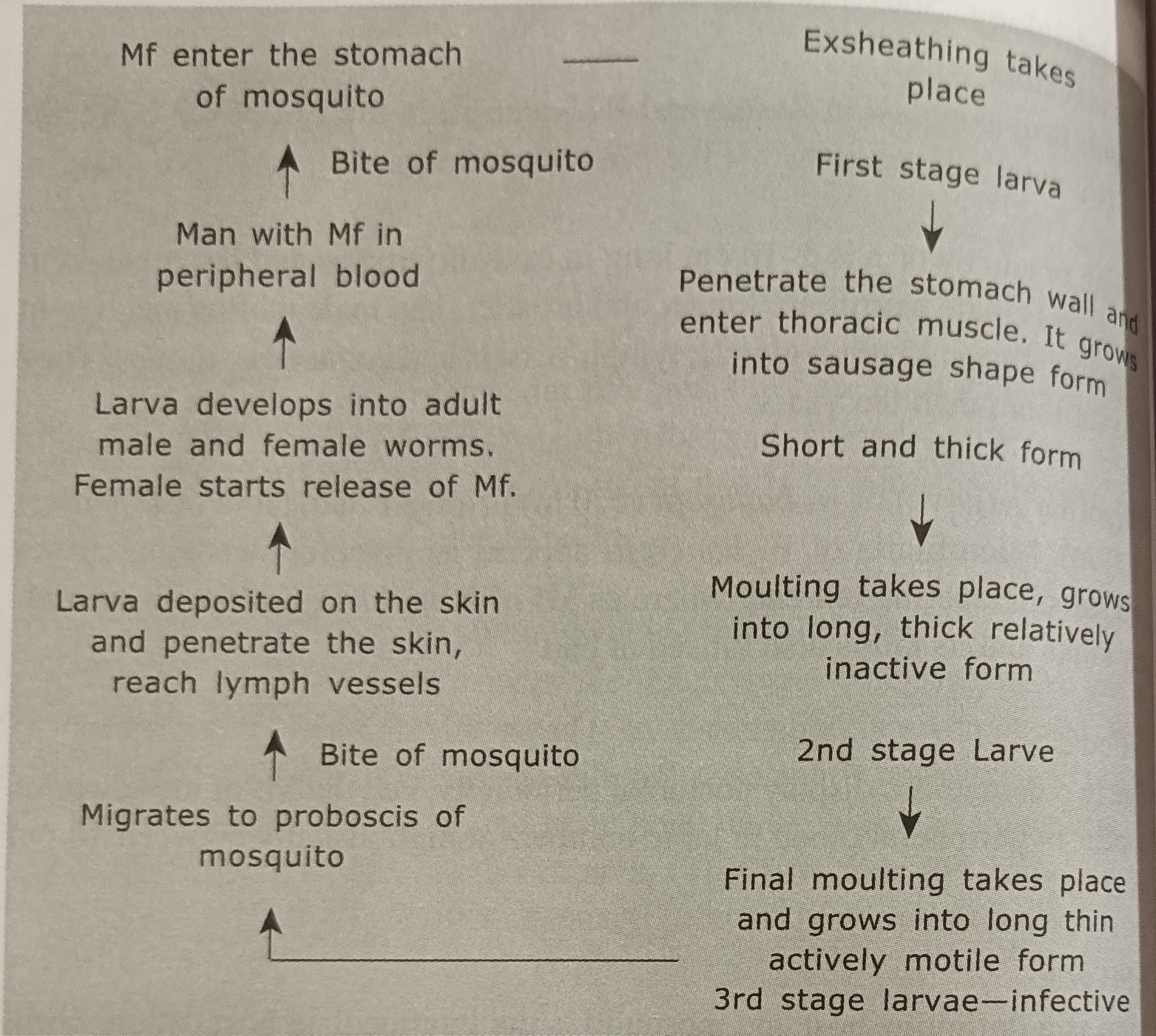
1. **Age**: All ages are susceptible to infection equally. Symptoms appear usually 20–30 years and above age groups.
2. **Sex**: Mf rate is higher in males, though both sexes are equally susceptible. So manifestations of chronic lesion are more in males than females. Probably it is due to females and are more covered than males.

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Environmental Factors

Tropical climate is favourable ground for both the parasites (*W. bancrofti* and *B. malayi*) and vector (mosquitoes). Humidity of costal areas (80%) and climate (20°C–40°C) is highly favourable for the spread of disease. Unplanned towns and cities will have more slums due to migraton of rural



poor to urban area. These slums are favourable ground for mosquito growth, because of bad drainage conditions, collection of polluted and dirty water around the houses in slums.

Social Factors

Poverty, illiteracy, poor housing conditions like ill ventilation, body lighting, mud flooring, etc., are associated with filariasis.

Vector (mosquito)

W. bancrofti is transmitted by *Culex fatigans*.

B. malayi is transmitted by *Mansonia annulifera*.

Mode of Transmission

In filariasis the transmission is biological. Mf develops in mosquitoes through first stage larva to third stage (infective) larva. It is called *cyclodevelopmental transmission*. By the bite of mosquito, the third stage larva will be deposited on the skin. Then this penetrates the skin and enters the system of human being, where it develops into an adult worm.

Incubation Period

A. **Intrinsic incubation period**: It is the time from the entry of the third stage larva to the development of adult worm and release Mf. So intrinsic incubation period is in human being. It is nine months to two years.

B. **Extrinsic incubation period**: It is the time taken by the Mf to enter the mosquito and develop into third stage larva. So intrinsic incubation period is in mosquito. It is usually 10–14 days.

Reservoir of Infection

Humans are the only reservoir for *W. bancrofti*. They are also the main reservoir for *B. malayi*, rarely monkey, dog, cats also act as reservoir for *B. malayi*.

Clinical Presentation

In some people microfilaria are present in the blood, but the person shows no symptoms. This is called a symptomatic microfilaraemia. Epidemiologically this group is very important, because unknowingly they will spread the infection in the community.

Some people show acute symptoms like fever, pain along the lymph vessels (due to lymphangitis) and groin (due to lymphadenitis). Here the fever is acute and recurrent. Some males suffer from epididymoorchitis (swelling and pain of testicles).

Lymph vessels are blocked by the parasite leads to recurrent oedema of single limb (usually the lower limb) and filarial fever. After repeated attacks of pitting type of oedema fibrosis will take place in the limb and leads to hard non-pitting type of oedema. This is called elephantiasis. For this 10–15 years are needed. Elephantiasis is more common in lower limb followed by scrotum (second commonest), arms, penis, vulva, breast. Some people suffer from hydrocele also.

Occult filariasis: is also called “tropical pulmonary eosinophilia” with respiratory symptoms. It is due to hypersensitivity reaction to filarial antigen, derived from Mf. They do not show Mf in their blood and no classical filarial symptom.

The filaria program in India includes the National Filaria Control Programme (NFCP) and the Elimination of Lymphatic Filariasis (ELF) program:

National Filaria Control Programme (NFCP)

Launched in 1955, the NFCP's goals include:

- Delimiting the problem
- Training personnel
- Implementing control measures in endemic areas

Elimination of Lymphatic Filariasis (ELF) program

Launched in 2004, the ELF program's goals include:

- Administering a single dose of diethylcarbamazine (DEC) annually through mass drug administration (MDA)
- Scaling up the MDA program to include albendazole (DA) in 2007
- Conducting Transmission Assessment Surveys (TAS) to validate the program in 2013

The NFCP has been integrated into the National Vector Borne Diseases Control Programme (NVBDCP) as the ELF Program. The NVBDCP integrates funds for all vector-borne diseases, including ELF.

Some of the control measures used in the filaria program include:

- Vector control
- Indoor residual spray in rural areas
- Antilarval measures in urban areas
- Biological control of mosquito breeding through larvivorous fish
- Environmental methods like deweeding, desilting, and filling ditches